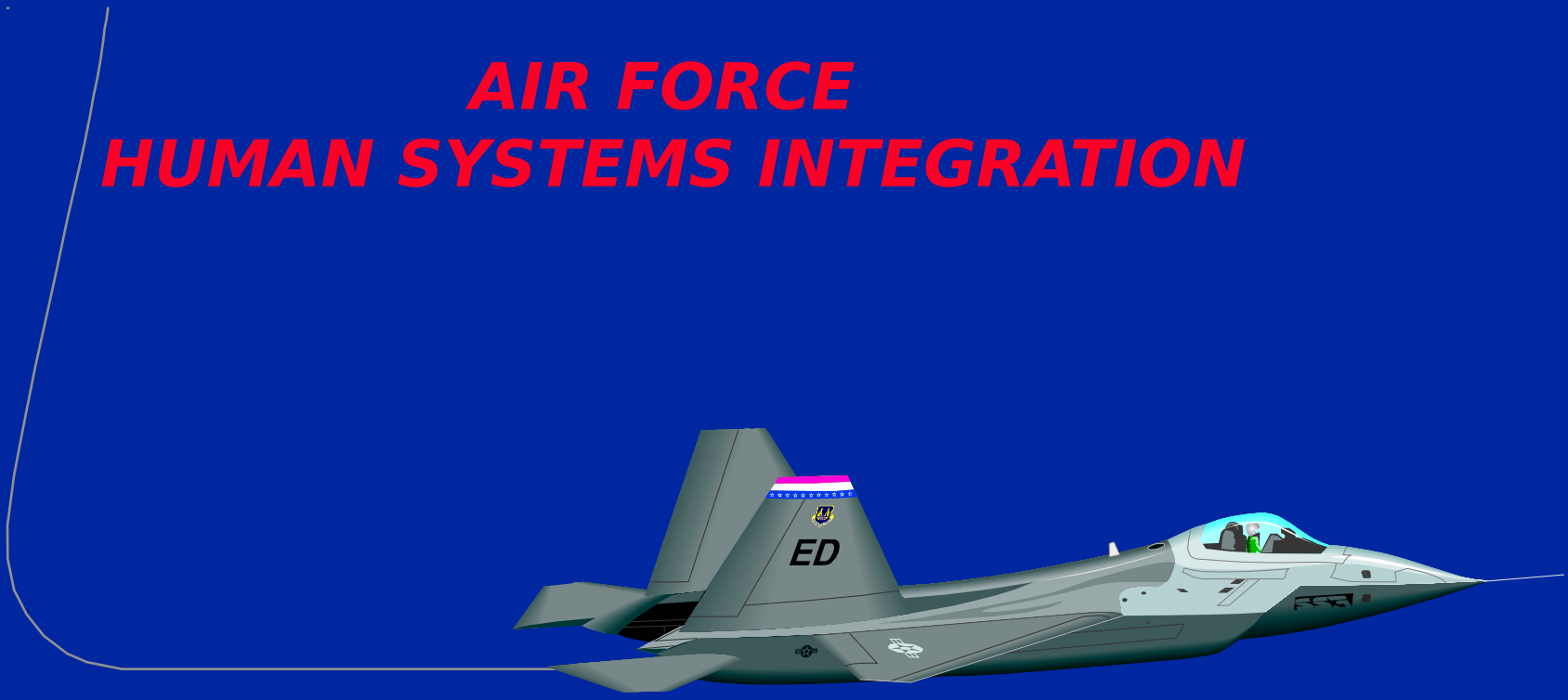
ACQUISITION …
FOCUS ON THE FUTURE

AIR FORCE
HUMAN SYSTEMS INTEGRATION



HUMAN SYSTEMS INTEGRATION

Overview

- **Human Systems Integration (HSI) Introduction**
- **HSI Elements**
- **Offices of Primary Responsibility**
- **AF Human Systems Integration Office (AF HSIO)**

HUMAN SYSTEMS INTEGRATION
ACQUISITION REFORM OBJECTIVES

- Adopt World Class Business Practices
- Increase Use of Commercial State-of-the-Art Technology
- Integrate Commercial and Military Industrial Bases
- Depend on Performance Specifications and Commercial Standards
- Streamline Processes to Reduce Cost and Cycle Time

Bottom line: Better--Faster--Cheaper

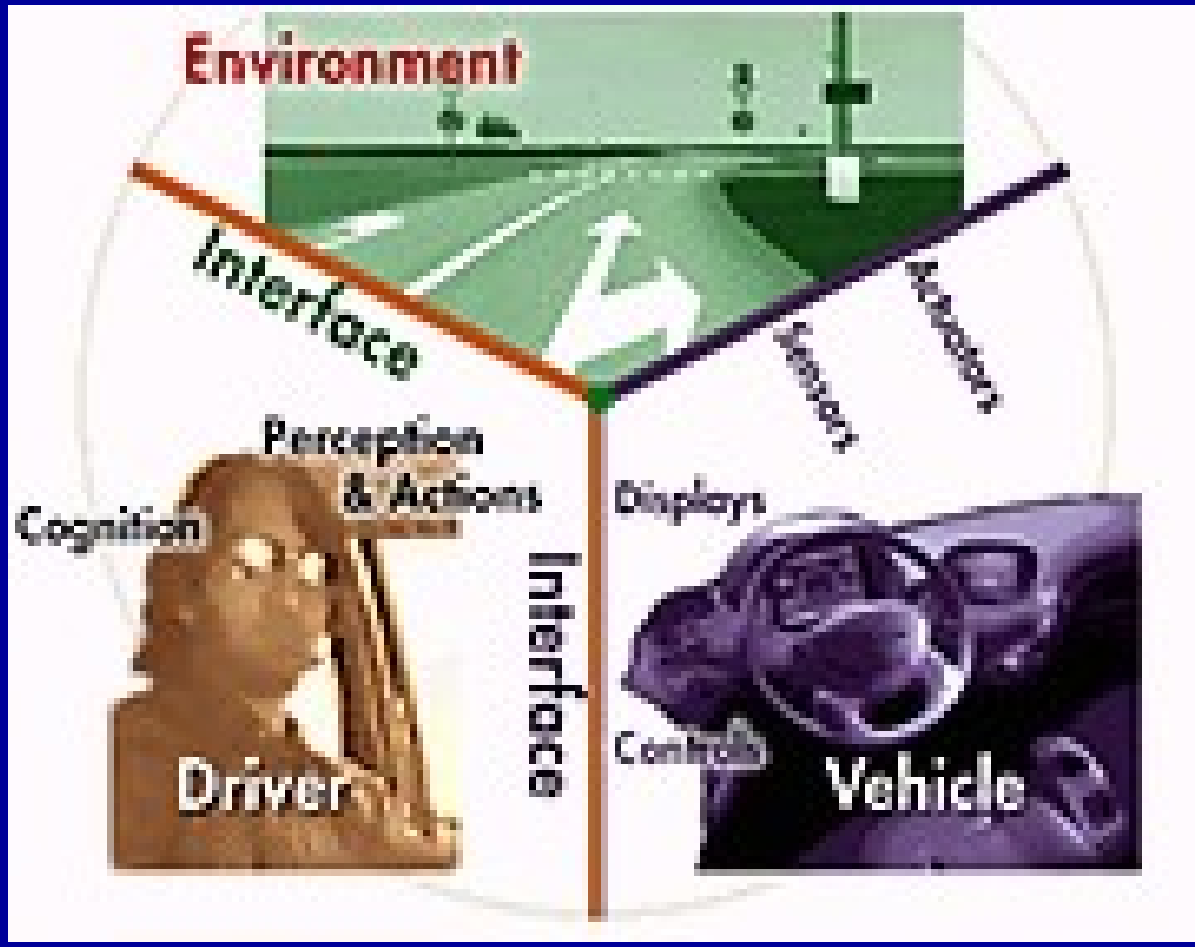
Human Systems Integration

HSI Introduction

"No! No! That's *Self Destruct.*
Set Distance is the One on the Left."

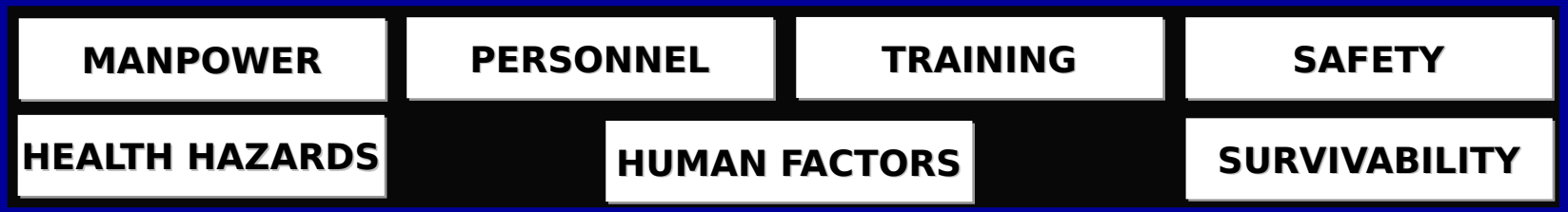
HUMAN SYSTEMS INTEGRATION

The Human Systems Integration department at Volvo Technological Development Corporation work to optimize the interaction between people and their vehicles. The principle goal is ensure a safe and efficient relationship between the user and the technical



HUMAN SYSTEMS INTEGRATION

HSI At A Glance



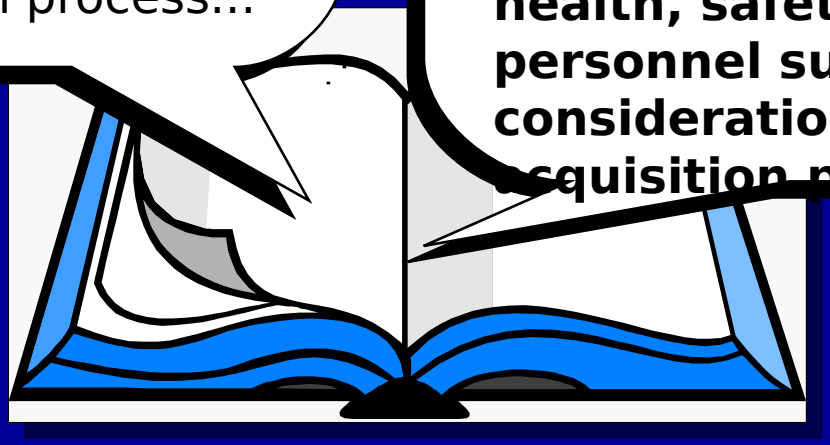
- **HSI Elements - Grouping of Seven Funct**
- **Manpower, Personnel, Training, Human Safety, Health Hazards, Survivability**
- **Define Human's Interaction With the Sy**
- **Interdependent Elements - Must Examin**

HUMAN SYSTEMS INTEGRATION

Why Do HSI?

DoD 5000.2-R, Part 5, Para 5.2.8.
"A comprehensive management and technical strategy for human systems integration shall be initiated early in the acquisition process..."

DoD5000.2-R, Part 1, Para 2.7.3
"The PM shall pursue HSI initiatives to optimize total system performance and minimize cost of ownership. The PM shall integrate manpower, personnel, training, human factors, health, safety, and personnel survivability considerations into the acquisition process. "



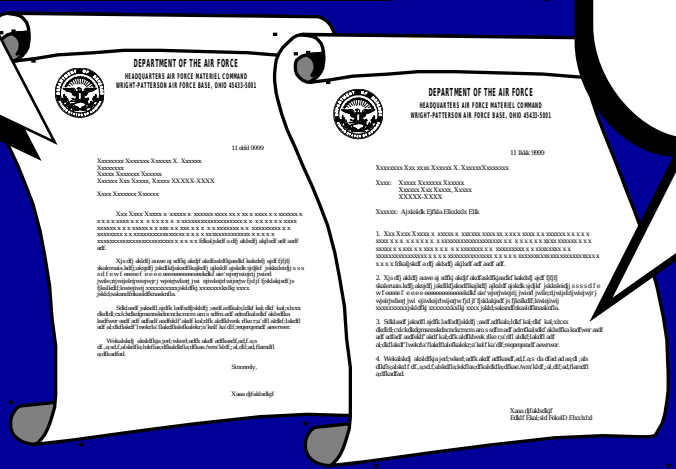
HUMAN SYSTEMS INTEGRATION

What Should The AF HSIO's Role Be?

HQ AFMC/CC, 2 Jun 00

"...Integrating the human into the early development of all Air Force acquisitions is a critical component..."

"The Acquisition Strategy Panel (ASP) is a key point early ...to insure HSI is being adequately considered"


DEPARTMENT OF THE AIR FORCE
HEADQUARTERS AIR FORCE MATERIEL COMMAND
WRIGHT-PATTERSON AIR FORCE BASE, OHIO 45433-5001
DEPARTMENT OF THE AIR FORCE
HEADQUARTERS AIR FORCE MATERIEL COMMAND
WRIGHT-PATTERSON AIR FORCE BASE, OHIO 45433-5001

SAF/AQ, 16 Jun 00

"The acquisition community must engage HSI more effectively early in the acquisition process."

HUMAN SYSTEMS INTEGRATION

INTEGRATION OF:

Manpower — Personnel — Training

Human Engineering — System Safety — Health Hazards

Survivability

THE GOAL IS TO:

- Influence system design and fielding
- Improve warfighter and mission effecti
- Reduce O&S costs
- Increase user and system performance
- Improve system sustainment

HUMAN SYSTEMS INTEGRATION

What Is The HSI Impact On Cost & Performance?

- Human Elements are 40-65% of O&S LCC
- Human Elements are 70% of System Variability

Human Systems Integration is about making informed choices to balance the integration of the human into the weapon system

HUMAN SYSTEMS INTEGRATION

What Does HSI Impact?

- **Cost**
  - **Acquisition**
    - **Fewer Changes**
  - **Operations**
    - **Reduced Workload**
  - **Support**
    - **Reduced Workload**
  - **Training**
    - **Reduced Hours**
  - **Logistics Footprint**

- **Performance**
  - **System Effectiveness**
  - **Availability**
    - **Turn Around Time**
    - **Sortie Rate**
  - **Survivability**
  - **Lethality**
  - **Safety & Hazards**
  - **Logistics Footprint**

Human Systems Integration

HSI Elements

HUMAN SYSTEMS INTEGRATION

What Do We Mean When We Say "H-S-I"?

MANPOWER	PERSONNEL	TRAINING	SAFETY
HEALTH HAZARDS	HUMAN FACTORS		SURVIVABILITY

- **"Human" in H-S-I Includes:**
  - **Operators, Maintainers, Supporters, and Trainers**
  - **Active, Reserve, Civil Service, and Contractors**
- **"Systems" in H-S-I Includes:**
  - **Hardware, Equipment, and Software That Function Together to Fulfill a Mission Need**
- **"Integration" in H-S-I Includes:**
  - **Integration Among the HSI Elements and With the Design**

HUMAN SYSTEMS INTEGRATION

What Is "Manpower" In HSI?

MANPOWER	**PERSONNEL**	**TRAINING**	**SAFETY**
HEALTH HAZARDS	**HUMAN FACTORS**		**SURVIVABILITY**

Responsible for Determining Number of Human Resources (Required & Authorized) to Operate and Support a System

Are my manpower numbers right?

- **Will the new capability change manpower requirements?**
- **What are the current authorizations?**
- **What are the projected authorizations?**

HUMAN SYSTEMS INTEGRATION

What Is "Personnel" In HSI?

MANPOWER	**PERSONNEL**	TRAINING	SAFETY
HEALTH HAZARDS	HUMAN FACTORS		SURVIVABILITY

Responsible for Assessing the Qualitative Personnel Attributes Required to Operate and Support a System

Do I have the people with the right skills?

- **Will the solution impact the Air Force Specialty Code structure?**
- **Are there unique mental or physical requirements?**
- **Can I reduce skill level requirements?**

HUMAN SYSTEMS INTEGRATION

What Is "Training" In HSI?

MANPOWER	PERSONNEL	**TRAINING**	SAFETY
HEALTH HAZARDS	HUMAN FACTORS		SURVIVABILITY

Responsible for Development of a Curriculum to Provide Personnel with Capability to Operate and Support a System

Will the training deliver? Rate/Quality?

- **Can contractors train for less?**
- **Can classroom hours be reduced?**
- **What type of training is best?**

HUMAN SYSTEMS INTEGRATION

What Is "Safety" In HSI?

MANPOWER	PERSONNEL	TRAINING	SAFETY
HEALTH HAZARDS	HUMAN FACTORS		SURVIVABILITY

Responsible for Reducing Probability and/or Severity of Risks, Accidents, or Bodily Injury

Incidents due to system failures and/or incorrect operation?

- **What is the probability and the severity of a failure?**
- **Are there fail-safe measures to eliminate incidents?**
- **Are there Safety concerns from the previous system?**

HUMAN SYSTEMS INTEGRATION

What Is "Health Hazards" In HSI?

MANPOWER	PERSONNEL	TRAINING	SAFETY
HEALTH HAZARDS	HUMAN FACTORS		SURVIVABILITY

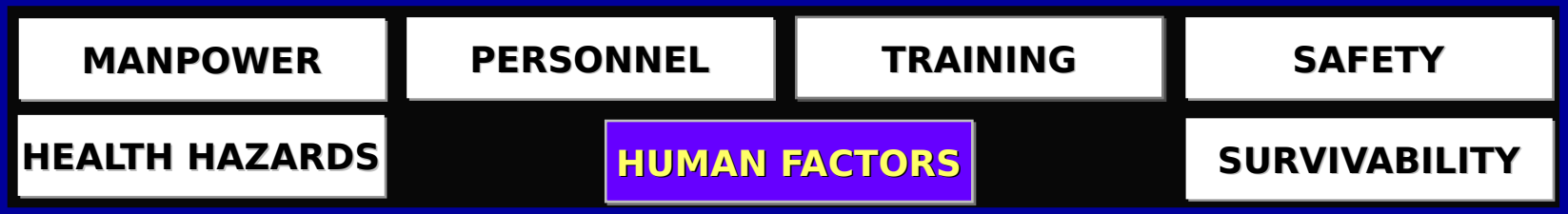
Responsible for Limiting or Reducing Bodily Injury or Death From Sources <u>Inherent</u> in Use and Operation of the System

What are the hazards in normal operation?

- **Are there existing hazards?**
- **Can you protect against or eliminate hazards?**
- **How does the hazard impact performance?**

HUMAN SYSTEMS INTEGRATION

What Is "Human Factors" In HSI?



Responsible for Optimizing Human/Machine Interface to Maximize Task Performance

Can tasks be done in the intended environment?

- **Does protective equipment impact design?**
- **Are there high workload drivers?**
- **How are the tasks allocated?**

HUMAN SYSTEMS INTEGRATION

What Is "Survivability" In HSI?

MANPOWER	PERSONNEL	TRAINING	SAFETY
HEALTH HAZARDS	HUMAN FACTORS		SURVIVABILITY

Responsible for Limiting the Probability of Personal Injury, Disability or Death of Users and Supporters in Their Interaction With the System

Can personnel survive in this system?

- **Is there a concern with fratricide?**
- **Are there Attack Avoidance issues?**
- **Can personnel survive an attack?**

HUMAN SYSTEMS INTEGRATION

INTEGRATION

- The ***Key*** word is Integration
- Systems Engineering is a balanced approach
- The seven Human Elements are constraints upon the design
  - They **are not independent** -- change or specification on one element may effect them all
  - Cannot pick and choose -- should include all or none

HUMAN SYSTEMS INTEGRATION

- There are NO Unmanned Systems
- HSI is anytime, anywhere, the human touches a system
- Every new acquisition or modification will be planned, designed, engineered and produced as a total system that optimizes the relationship between advanced technology and the human to achieve maximum capability at the lowest life cycle cost.

Human Systems Integration

Offices of Primary Responsibility

HUMAN SYSTEMS INTEGRATION

Who Is Responsible For Getting HSI Done?

- **Requirements Developers**
  - **Constraints & Performance Requirements**
- **Science & Technology**
  - **Interfaces (e.g. Cockpits, Computers)**
- **Program Offices**
  - **Planning, Solicitation Process, Systems Engineering, Acquisition Logistics**
- **Test & Evaluation**
  - **Operational Suitability & Effectiveness**

HUMAN SYSTEMS INTEGRATION

CAIV and HSI?

- **CAIV - DoD 5000.2-R Directed**
  - **Aggressive & Achievable Cost Objectives**
  - **Cost/Performance/Schedule Tradeoff Analyses**
  - **Teams With User, Acquisition, and Industry**
  - **Early Implementation /Life Cycle Focus**
- **HSI**
  - **Informed Tradeoffs**
  - **Should Be Integral to CAIV**
  - **40-65% of Life Cycle Costs related to human elements**

HUMAN SYSTEMS INTEGRATION

What Is The AF HSI Office?

- **311 HSW/XPH, Aeronautical Systems Center, Brooks AFB TX**
- **Facilitating AF Implementation of DoD Policy**
- **Teaming with MAJCOMs, SPOs, Test Centers, Depots,and the Other DoD Services**
- **Provide a “Center of Excellence” for HSI**

HUMAN SYSTEMS INTEGRATION

MISSION OF THE AF HSI OFFICE

- **Team with MAJCOMs, SPOs, Test Centers, Depots and other services**
  - **Review MNSs and ORDs**
  - **Participant In Developing an HSI strategy**
- **Provide training courses to users and developers**
- **Conduct initial HSI assessments with the user and developers**
- **Maintain gateway for HSI data and tools**

OPTIMIZING HUMAN PERFORMANCE WHILE CONTROLLING LIFE CYCLE COSTS

Manpower

Personnel

Human Factors Engineering

Training

Safety

Health Hazards

Survivability

HSI Elements

HSI Planning + HSI Policy & Process = HSI Integration

HUMAN SYSTEMS INTEGRATION

How Can I Contact The AF HSIO?

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